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# **The Determinants of Capital Structure: Evidence from the Asia Pacific Region<sup>\*</sup>**

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## **Abstract**

The paper contributes to the capital structure literature by investigating the determinants of capital structure of firms operating in the Asia Pacific region, in four countries with different legal, financial and institutional environments, namely Thailand, Malaysia, Singapore and Australia. The results suggest that the capital structure decision of firms is influenced by the environment in which they operate, as well as firm-specific factors identified in the extant literature. The financial crisis of 1997 is also found to have had a significant but diverse impact on firm's capital structure decision across the region.

JEL Classification: G32

Keywords: Capital structure; Leverage; Asia Pacific Region; Financial crisis;

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## **1. Introduction**

The prediction of the Modigliani and Miller model that in a perfect capital market the value of the firm is independent of its capital structure, and hence debt and equity are perfect substitutes for each other, is widely accepted. However, once the assumption of perfect capital markets is relaxed, the choice of capital structure becomes an important value-determining factor. This paved the way for the development of alternative theories of capital structure decision and their empirical analysis. Although it is now recognized that the choice between debt and equity depends on firm-specific characteristics, the empirical evidence is mixed and often difficult to interpret. Moreover, still very little is understood about the determinants of the firm's financing mix outside the US and other major developed markets, with only a few papers analysing international data (Rajan and Zingales, 1995; Booth et al., 2001; and Antoniou et al., 2002). Certainly, there is not enough evidence on how theories formulated for firms operating in major developed markets can be applied to firms outside these markets, and in countries with different institutional and legal environments. For example, given the economic importance of the Asia Pacific region and the diversity of countries in this region, it is surprising that so little research has been so far conducted<sup>1</sup>.

In addition, very little is known about the possible effects of the East Asian financial crisis of 1997 on corporate decision-making. The 1997 crisis, which originated in Thailand, affected the region's capital markets severely, with outflows of foreign investments as international investors became concerned with the higher risk in the affected countries. Raising capital in these countries became more costly because of higher risk premia, compounded by the higher level of interest rates needed to support local currencies. Hence, a comparative analysis of the determinants of capital structure both across countries and

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<sup>1</sup> Published studies include Wiwattanakantang (1999) for Thailand; Suto (2003) for Malaysia; Prasad et al. (2003) for Thailand and Malaysia; Cassar and Holmes (2003) and Zoppa and McMahon (2002) for Australia.

between the pre- and post-crisis periods should provide valuable insights into firm's financial decision making.

The paper contributes to the literature by examining the determinants of corporate capital structure in four countries in the Asia Pacific region, namely Thailand, Malaysia, Singapore and Australia. The choice of countries is motivated by several factors. Firstly, they are all in the Asia Pacific region where the literature on the determinants of capital structure is sparse. Secondly, they have different institutional set-ups, such as financial markets, legal traditions, bankruptcy codes and corporate ownership structure. In particular, Malaysia, Singapore and Australia are members of the British Commonwealth and thus have some common attributes in accounting practices, corporate governance and corporate control. In addition, Thailand and Malaysia are emerging markets, while Singapore and Australia are more established markets. This diversity offers the opportunity to assess the effects of different environments on corporate financial decisions. Thirdly, they were hit in different degrees by the 1997 East Asian financial crisis: the crisis hit Thailand and Malaysia most severely; Singapore was also affected but its economy recovered more quickly, while Australia escaped it altogether (Grenville, 1999; and Cha and Oh, 2000).

The paper is organised as follows. The second section reviews the corporate governance and institutional environments in the sample countries and discusses their possible implications on the choice of financing mix of firms operating in these countries. Section three presents the methodology, discusses the potential determinants of capital structure and develops testable propositions. Data and findings are discussed in section four, while section five offers concluding remarks.

## **2. Corporate Governance and Institutional Environment in the Asia Pacific Region**

The legal, regulatory and institutional environments of a country affect the relationships between the firm's stakeholders, and thus the process of corporate governance (La Porta et al., 1998; and Demirguc-Kunt and Maksimovic, 1996 and 2002). Table 1 summarises major aspects of corporate governance, institutional and legal environment in the Asia Pacific region in comparison to the US and the UK, as assessed by existing literature. Like the US and the UK, all the countries under investigation are categorised as market-based economies; however, the ownership of firms in Thailand, Malaysia and Singapore is primarily family-based. With respect to financing patterns, Beck et al. (2002) show that firms in more developed countries have better access to external finance. Hence Thai and Malaysian firms are expected to rely more on internal resources (equity) than Australia and Singaporean firms. Common law is the foundation of the British Commonwealth's members, including Malaysia, Singapore and Australia. Although Thailand's law originated from common law, it has been influenced by French civil law. Among our sample countries, Australia ranks the highest on all three definitions of the 'rule of law', followed by Singapore, Malaysia and Thailand. Since the rule of law in Thailand is relatively weak, the level of expropriation of minority stakeholders is likely to be the highest implying more agency problems.

[INSERT TABLE 1]

When the law protects outside investors, they become more willing to finance firms. Thus, firms in countries with weaker investor rights may be forced to use more internally generated funds, as external capital is likely to be expensive and/or rationed. Table 1 shows that Singapore and Malaysia have higher standards of legal protection than Australia and Thailand. Furthermore, the law provides equal protection to creditors and shareholders in

Malaysia and Singapore and hence the debt-equity ratios in these countries are likely to remain independent of these provisions. On the other hand, shareholders appear to be better protected in Australia, while creditors have relatively better protection in Thailand. Therefore, Australian firms are expected to have relatively higher levels of equity in their capital structure, while Thai firms are likely to have higher debt.

The ownership structure of a firm can also affect its financial structure as it has implications for agency relationships within the firm. Evidence shows that firms in East Asian countries are usually owned by a small number of families (Wiwattanakantang, 1999; and Claessens and Fan, 2002). Such closely held ownership can lead to better performance, as the pooling of resources and information decreases transaction costs. However, concentration of ownership and management in few hands can also lead to high expropriation of minority stakeholders. Thus, on these bases, the level of external borrowing of firms in East Asian countries is expected to be lower than that of firms in western developed economies. In particular, Claessens et al. (2002) show that Thailand has the highest ownership of publicly traded companies by families and financial institutions among the countries in the sample. This could explain the lowest frequency of bankruptcies in Thailand. In addition, since Thai and Malaysian firms have their primary banks as their shareholders, they should have easier access to bank loan and less need for collateral. Hence, the effect of tangible assets on firms' leverage is expected to be weaker in these two countries, and more so in Malaysia where banks are over-protected and capital markets more stringently regulated (Suto, 2003). This is expected to: (i) bring about a reduction in the agency cost of debt and thus lead to higher levels of debt; (ii) weaken the effect of tangibility on leverage as the firms should be able to borrow without, or with lower, collaterals; and (c) lessen the effect of firm's size on leverage, as bankruptcy risk should be lower. On the other hand, collateral should be

a major factor for Australian firms, as they operate in an environment where creditors' protection is very low and the firms' relation with their lenders is at arm's length.

Finally, Table 1 shows differences in the involvement of government in business across our sample countries. Large firms in Singapore are heavily controlled by the government (Mak and Li, 2001). Government-linked corporations have several advantages, such as better protection from the market for corporate control, easier access to alternative sources of financing, and guaranteed (implicit) solvency. This suggests a less important role for asset tangibility, liquidity, earnings volatility and firm size in the capital structure choice of Singaporean firms. In summary, the above discussion reveals that differences in the institutional traditions, legal framework and corporate governance practices within the sample countries may have implications on the capital structure choice.

### 3. Methodology, Hypotheses Development and Variable Identification

#### 3.1 Firm-Specific Determinants of Capital Structure by Country

To assess the determinants of capital structure in the four sample countries, individual firm's leverage ratios are modelled as a function of several firm-specific factors in a cross-sectional framework. Specifically, the following relationship is estimated using OLS for each country:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^N \gamma_k FF_{k,i,t-a} + \varepsilon_{i,t} \quad (1)^2$$

where,  $Y_{i,t}$  is firm's  $i$  leverage at time  $t$ , measured at the accounting year-end;  $FF_{k,i,t-a}$  is a vector of  $k$  firm  $i$ 's specific factors, averaged over the previous  $a$  years to reflect the medium to long term nature of the capital structure decision (Rajan and Zingales, 1995; and Pandey,

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<sup>2</sup> The empirical version of Equation 1 controls for industry effects; however, no statistically significant effect was found.

2001). For the full sample period, the dependent variable is the leverage of 2001 and the explanatory variables are the averages of 1993-2000. This averaging process also reduces the possibility of measurement error and the effects of random fluctuations in the variables. In addition, the averages of the explanatory variables are lagged one period in order to isolate the analysis from the potential reverse causality between independent and dependent variables and to provide a more robust test of the theory. The vector of firm-specific variables incorporates the following factors: tangibility, profitability, firm size, growth opportunities, non-debt tax shield, liquidity, earnings volatility, and share price performance. The choice of factors and the hypothesis formulation are motivated by both theoretical and empirical considerations<sup>3</sup>. Table 2 summarizes the relationships postulated by the theory between each explanatory variable and leverage, and their empirical verification.

[INSERT TABLE 2]

The *leverage ratio*, the dependent variable, is measured as<sup>4</sup>:

$$\text{Debt to Capital Ratio} = \frac{\text{Total debt}}{(\text{Total debt} + \text{Market value of equity} + \text{Book value of preference shares})}$$

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<sup>3</sup> See Harris and Raviv (1991) for an extensive review of the theoretical literature on the determinants of capital structure.

<sup>4</sup> As Harris and Raviv (1991) argue, the choice of measures for both leverage and the explanatory variables is crucial, as it may affect the interpretation of the results. Rajan and Zingales (1995) also show that the determinants of capital structure are sensitive to the measure of leverage. Thus, different measures of leverage and of some of the independent variables were used to assess the robustness of the results presented in the paper. The measure of leverage based on the market value of equity, rather than the book value, was finally chosen as it gave more theoretically consistent results, in line with Wiwattanakantang (1999) and Suto (2003), among others.



*Tangibility* is defined as the ratio of total fixed assets to total assets. Agency theory suggests that firms with high leverage tend to underinvest, or invest suboptimally, and thus transfer wealth away from debtholders to equityholders. These cause lenders to require collateral because the use of secured debts can help alleviate this problem. Moreover, the liquidation value of the firm increases with the tangibility of assets and decreases the probability of mispricing in the event of bankruptcy. Firms unable to provide collaterals will have to pay higher interest, or will be forced to issue equity instead of debt (Scott, 1977). Thus, a positive relationship between tangibility of assets and leverage is anticipated.

*Profitability* is defined as the ratio of earnings before interest, tax and depreciation to total assets. The pecking-order theory postulates that managers prefer to finance projects internally because of the informational asymmetry between managers and outside investors. In addition, profitable firms prefer not to raise external equity in order to avoid potential dilution of ownership. Thus, we expect an inverse relation between profitability and leverage. *Firm size* is measured by the natural log of assets. The trade-off theory postulates a positive relation between firm size and debt, since larger firms have been shown to have lower bankruptcy risk and relatively lower bankruptcy cost. In addition, large firms have lower agency costs of debt, relatively smaller monitoring costs, less volatile cash flows, easier access to credit market, and require more debt to fully benefit from the tax shield. Therefore, firm size is expected to have a positive impact on leverage.

*Growth opportunity* is defined as the book value of total assets less the book value of equity plus the market value of equity divided by the book value of total assets. Higher growth opportunities provide incentives to invest suboptimally, or to accept risky projects that expropriate wealth from debtholders. This raises the cost of borrowing and thus growth firms tend to use internal resources or equity capital rather than debt. In addition, high growth firms whose value comes from intangible growth opportunities do not want to commit

themselves to debt servicing as their revenue may not be available when needed. Therefore, an inverse relationship between growth opportunity and leverage is postulated.

In the absence of more accurate measures, the *non-debt tax shield* is defined as the ratio of depreciation to total assets. As predicted by the trade-off theory, a major motivation for using debt instead of equity is to save corporate tax. However, firms can use non-debt tax shields such as depreciation to reduce corporate tax. Thus, a higher non-debt tax shield reduces the potential tax benefit of debt and hence it should be inversely related to leverage. *Liquidity* is defined as the ratio of current assets to current liabilities. As predicted by the pecking order theory, firms with high liquidity will borrow less. In addition, managers can manipulate liquid assets in favour of shareholders against the interest of debt holders, increasing the agency costs of debt. Thus a negative relationship between liquidity and leverage is expected. The *volatility of earnings* is defined as the absolute difference between the annual percentage change in earnings before interest and taxes and the average of this change over the sample period. Higher volatility of earnings increases the probability of financial distress, since firms may not be able to fulfil their debt servicing commitments. Thus firm's debt capacity decreases with increases in earnings volatility leading to an expected inverse relation with leverage. *Share price performance* is defined as the first difference of the logs of annual share prices, matched to the month of firms' fiscal year-end. The history of share prices has been shown to have an impact on the firm's capital structure. Due to the information asymmetry between managers and outside investors, new shares are issued at a discount. If equity is issued when shares are overvalued, the real cost of the discount to the existing shareholders can be smaller, or none. Therefore, firms prefer equity to debt when share prices increase. As predicted by the market timing theory (Baker and Wurgler, 2002), share price performance and leverage should be inversely related.

As stated earlier, one of the objectives of the paper is to examine the possible effects of the Asian financial crisis of 1997 on the capital structure decision process. To achieve this, Equation (1) is further estimated over two sub-samples: (i) a pre-crisis period, where the dependent variable is the leverage ratio in 1996 and the explanatory variables are the averages over 1993-1995; and (ii) a post-crisis period, where the dependent variable is the leverage ratio in 2001 and the explanatory variables are the averages over 1998-2000. Since the crisis started in June-July of 1997, the data for this year are excluded in the sub-sample analysis. Wald statistics are estimated to examine whether there has been any significant change in the role of the explanatory variables due to the financial crisis of 1997.

### *3.2 The Effects of Country-Specific Variables on the Capital Structure Decision*

In the light of the differences in the countries' institutional and legal environments as described in section 2, equation (1) is re-estimated using fixed effect panel and pooled OLS procedures. The data of the four sample countries are pooled to create one panel data sample, and the firm-specific factors are augmented with seven additional country specific variables, namely the degree of stock market's activity, the level of interest rates, the legal protection of creditor's rights, ownership concentration, and three country dummies. Three regressions are estimated separately to avoid potential multicollinearity problems due to the high correlation between country dummies, creditor's rights and ownership concentration. The first regression includes country dummies which are replaced by creditor's rights and ownership concentration in turn in the second and third regressions.

*Stock market's activity* is measured by the ratio of traded value to market capitalisation, matched to the month of firms' fiscal year-end. According to Demirguc-Kunt and Maksimovic (1996), financial market development plays an important role in the firms' financing choice. As stock market activity increases, firms' preference for equity over debt

also increases. Therefore, stock market's activity is expected to be inversely related to debt. The *level of interest rates* is proxied by the lending rate<sup>5</sup>, matched to the month of firms' fiscal year-end. In the presence of frictions such as taxation and bankruptcy costs, changes in interest rates can affect capital structure, as firms are more likely to use debt when the cost of borrowing is low. Under this hypothesis the level of interest rates is expected to be negatively related to leverage. However, interest rates also incorporate inflation expectations and thus firms could be expected to shift from equity to debt financing when interest rates are increasing. In this case, the level of interest rates is expected to be positively related to leverage. Three *country dummy variables* are also included in the model, equal to 1 for Thailand (THDUM), Malaysia (MLDUM) and Singapore (SPDUM) respectively, and 0 otherwise. These dummies are intended to capture differences in leverage between the sample countries not detected by other variables. As a proxy for *creditors' rights*, the score by La Porta et al. (1998) shown in Table 1 is used. Better creditor's rights encourage the development of loan capital markets and are likely to decrease the cost of loan capital as creditor's risk is decreased by better legal protection. This leads to the prediction of a positive relationship between creditor's rights and leverage. The ownership by the three largest shareholders of the ten largest non-financial domestic firms presented by La Porta et al. (1998) and shown in Table 1 is used as a proxy for *ownership concentration*. Both agency and signalling theories predict that higher concentration induces higher levels of monitoring, implying a reduction in management discretion and asset substitution respectively. This leads to a diminished role of debt in mitigating moral hazard and to debt losing reliability as a managerial signal. Thus a negative relationship between ownership concentration and leverage is expected.

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<sup>5</sup> The lending rate used in this paper is the maximum rate charged by commercial banks as recorded by the IMF International Financial Statistics and reported by Datastream.

## 4. Data and Empirical Results

### 4.1 Data

As discussed above, the selection of sample countries, namely Thailand, Malaysia, Singapore and Australia, is guided by the objectives of: (i) analysing the determinants of capital structure of the firms operating in Asian Pacific countries with different legal, financial and corporate governance systems; and (ii) investigating the potential influence of the 1997 financial crisis on the capital structure decision process. The annual data are obtained from Datastream to cover the period 1993-2001. The sample includes all non-financial firms listed in the relevant national stock exchanges for which a continuous data set exists over the sample period. Hence the sample consists of 294 Thai, 669 Malaysian, 345 Singaporean, and 219 Australian firms.

Summary statistics of the major variables over the sample period are presented in Table 3, while Figure 1 depicts the annual average leverage ratio of sample countries. Both set of figures reveal that Thai firms were consistently more heavily levered, while Australian firms had the lowest leverage ratio<sup>6</sup>. Moreover, the increase in the leverage ratio over the period was highest in Malaysia, followed by Thailand, while leverage remained almost constant in Australia. This is consistent with the highest legal protection of shareholders in Australia and the highest creditor's protection in Thailand and Malaysia, shown in Table 1 and discussed in Section 2 above. It is also noteworthy that the average leverage ratios in Thailand and Malaysia increased substantially after the 1997 financial crisis, motivating further an investigation into the possible implications of the crisis on corporate financing decisions<sup>7</sup>.

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<sup>6</sup> A t-test of equality in means shows that the annual leverage ratio of firms in Thailand differs significantly from all other countries' leverage; the average leverage ratios of firms in Singapore and Australia are also significantly different.

<sup>7</sup> It must be however noted that the increase in debt ratios after the crisis is partly due to the fact that firms suffered losses and their market capitalization fell.

[INSERT TABLE 3]

[INSERT FIGURE 1]

## 4.2 *Empirical Results*

The cross-sectional results from estimating equation (1) for each individual country are reported in Table 4. For each country, the first column presents the results over the whole sample period, while columns two and three present the results pertaining to the period before and after the 1997 crisis, respectively. The findings over the whole period are discussed first and an analysis of pre- and post-crisis differences follows.

### 4.2.1 *Cross-sectional results for individual countries and firm-specific effects over the whole sample period*

The relationship between leverage and *tangibility* (TANG), while positive as expected, is not statistically significant in any country with the exception of Australia. This result is consistent with Witwattanakantang (1999) for Thai firms. It is however in contrast with the findings of Prasad et al. (2003) and Suto (2003) who find a positively significant relationship for Malaysian firms, and Booth et al. (2001) who find a negative relationship for Thai firms. As discussed in Section 2, the insignificant effect of tangibility can be explained by the tight family held and concentrated ownership and the close relationship of firms with their lenders, and thus the lesser need for collateral in order to borrow. In addition, especially for Singaporean firms, this could also be due to the relatively high level of government ownership. In contrast to Cassar and Holmes (2003), tangibility is found to have a positive impact on the leverage of Australian firms, which have dispersed ownership and arm's length relationship with their lenders, and hence collaterals play an important role in raising debt

capital. Moreover, Australia has the lowest level of legal protection for creditors and thus it is natural for Australian lenders to look for added security.

[INSERT TABLE 4]

The relationship between *profitability* (PROF) and leverage is found to be negative as postulated, but statistically insignificant for all countries with the exception of Malaysia. This is in contrast with most previous studies analysing only a limited set of variables (Rajan and Zingales, 1995; Booth et al., 2001; Zoppa and McMahon, 2002; and Cassar and Holmes, 2003) and reporting a significant effect of profitability on leverage. In comparison to these studies, this paper includes additional firm specific variables overcoming a possible omitted variables problem in the previous literature<sup>8</sup>. The negative and significant result for Malaysia is consistent with the predictions of the pecking order theory, showing that firms prefer to use internal sources of funding when profits are high.

*Firm size* (SIZE) has a positively significant impact on leverage in all countries, with the exception of Singapore, where firms receive government support and thus face less risk of financial distress whatever their size. This finding is consistent to Wiwattanakantang (1999), Booth et al. (2001), Pandey (2001) and Prasad et al. (2003), and with the trade-off and agency theories, confirming that larger firms tend to have better borrowing capacity relative to smaller firms. As expected, the impact of *growth opportunity* (GROW) on leverage is negative for all countries, with the exception of Australia, but it is significant only for Thailand and Singapore. This gives support to the predictions of the agency theory that high

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<sup>8</sup> To evaluate this, a restricted version of equation (1) with only the four variables in Rajan and Zingales (1995) was estimated. The results confirm a significant inverse effect of profitability on leverage in all countries and hence that the findings presented in this paper are not data specific.

growth firms use less debt since they do not wish to expose themselves to possible restrictions imposed by lenders. It is also consistent with most previous studies on the region (e.g., Zoppa and McMahon, 2002), except Booth et al. (2001) who found a positive relationship for Thai and Malaysian firms.

The estimated coefficient of *non-debt tax shield* (NDTS) has the predicted negative sign and is statistically significant for all countries supporting tax-based models of capital structure. It also confirms the findings of previous studies such as Wiwattanakantang (1999). Similarly, *liquidity* (LIQ) and *share price performance* (SPP) have a negative and significant relationship with leverage in all countries. Both findings confirm the postulated hypotheses that firms tend to use their liquid assets to finance their investment in preference to raising external debt, and that they tend to prefer equity to debt when share prices are rising. On the other hand, consistent with Wiwattanakantang (1999), *earnings volatility* (VOL) appears to have no significant effect on leverage in any country. Firms may ignore the volatility of earnings if the risk and costs of entering into liquidation are low. This may occur if the borrowing level of firms is well below their debt servicing capacity, as may be the case in Australia, and if ownership is concentrated and family-based as in Thailand.

In summary, the estimates presented in Table 4 for the whole sample period show some similarities across countries. Non-tax debt shield, liquidity and share price performance appear to significantly influence the leverage decision in all countries, consistently with the stated hypotheses. With the exception of Singapore where the state is more closely involved with firms, size is also a very important determinant of capital structure in the region. However, the results also highlight some disparities, possibly due to institutional, legal and governance differences between countries. This will be further investigated in Section 4.2.3.



#### *4.2.2 Cross-sectional results for individual countries and firm-specific effects by pre- and post-crisis periods*

The East-Asian financial crisis of 1997 originated in Thailand and spilled over to other Asian countries. This severely affected the capital markets of the region. In Thailand, Malaysia and Singapore, the value of the stock market fell by more than 30%, while Australia was not directly affected. The sudden and unexpected financial crisis of these high growth economies also affected investors across the world. Following the crisis, the East-Asian capital markets experienced a significant outflow of foreign investment and their governments responded in different ways (Bank Negara Malaysia, 1998; Nesadurai, 2000; and Meesok et al., 2001). Raising capital within the affected countries became more costly, as interest rates were raised and investors became more aware of risk and consequently expected better investor protection.

The results for the pre- and post-crisis periods presented in Table 4 show that the crisis appears to have affected the process of capital structure decision, implying that major changes to the overall economic environment may significantly alter the determinants of firm's decisions. Generally, the significance of some of the determinants over the whole period, such as firm size, non-debt tax shield and liquidity, seems to be mainly driven by their significance in the post-crisis period. On the contrary, the contribution of determinants, such as tangibility of assets, volatility of earnings and share price performance, seems to be unaffected by the crisis. Finally, whenever the determinant is significant both before and after the crisis, the coefficient, while of the same sign, has a significantly different impact in the two periods, as indicated by the Wald test results presented in Table 4.

More specifically, the crisis seems to have influenced the role of *firm size* (SIZE) on capital structure decision significantly. Prior to the crisis, the role of firm size was not significant for both Thailand and Malaysia, but it became a significant factor after the crisis.

Even in Singapore, where firm size was not significant over the whole period, it became significant after the crisis. This may indicate that after the crisis firms became more concerned with their survival and bankruptcy risk. It is also possible that after the crisis lenders became more inclined to lend to larger firms in an attempt to decrease default risk. On the contrary, the role of *growth opportunity* (GROW) differs across the sample countries. While for Thai firms growth became insignificant after the crisis, for Malaysian firms it is only significant after the crisis. This difference could be rationalised by the faster recovery of the Malaysian economy as compared to Thailand. As faster economic growth is associated with the availability of more internal resources for companies, Malaysian growth firms tend to borrow less after the crisis according to the agency theory prediction.

In relation to the *non-debt tax shield* (NDTS), the coefficient is insignificant before the crisis but significant after the crisis for all countries. No doubt, with the increased cost of borrowing and perceived risk of bankruptcy after the crisis, firms are likely to have looked for alternative ways of minimising tax. In this context, NDTS would have become more relevant to the capital structure decision. Although the coefficients of *liquidity* (LIQ) are significant and negative during both sub-sample periods for Thailand and Singapore, the Wald test shows that for both countries the size of the coefficients increased significantly after the crisis indicating its increased importance in capital structure. Similarly, the coefficient of the *share price performance* (SPP) in all countries except Australia, while significant both before and after the crisis, is significantly different between the two periods.

Thus far the findings reveal that the capital structure decision is driven by both firm and country specific factors. The 1997 financial crisis also appears to have impacted by different degrees on different countries. This highlights the importance of formally testing the impact of different institutional and legal factors, as well as economic conditions, on firm's decisions.

#### 4.2.3 Panel estimates with country-specific effects

Table 5 presents the fixed country effect estimates of Equation 1 using a panel data set that includes all companies across all countries over the sample period. This is estimated over the whole sample period, as well as the pre- and post-crisis periods. Additional country specific variables have been included, as explained in Section 3.2 above, namely the financial activity of the stock market, the interest rate and country dummies. The results associated with including creditor's rights and ownership structure, but excluding country dummies, will be discussed later.

[INSERT TABLE 5]

Overall the results presented in Table 5 reveal similar relationships of leverage with firm-specific determinants to the previous findings (Table 4). They clearly show that the 1997 financial crisis had an impact on the capital structure decision of firms in the region, at the level of both firm-specific and country-specific determinants. The relationship between the *financial activity of the stock market* (FACT) and leverage is found to be significant and negative as hypothesized in Section 3.2. On the contrary, the *interest rate* (INT) variable has an insignificant relationship with leverage over the whole sample period and before the crisis, while it becomes significant and positive after the crisis. This is not surprising given the contradictory hypotheses formulated in Section 3.2 on the relationship between interest rates and leverage. The positive finding for the period after the crisis suggests that firms may have been more concerned about the effects of future inflation on their cost of capital, than the immediate risk of default, and support existing empirical evidence (Thies and Klock, 1992). Finally, the country dummies confirm that leverage is influenced by country specific factors, since almost all coefficients are statically significant, although of different sign. According to a Wald test, they are also significantly different across countries.

To test for more specific legal and institutional determinants, Equation 1 is estimated with pooled OLS and substituting the country dummies first with an index of creditor's rights (CRR), and subsequently with a measure of ownership concentration (OWN), as explained in Section 3.2. The coefficient estimates for CRR show a significant and positive relationship of this index with leverage over the whole sample period (0.027; t-ratio of 5.28) and after the crisis (0.0413, t-ratio of 7.03) in accordance with the stated hypothesis, while before the crisis is marginally significant but negative (-0.0153; t-ratio of -1.7). Overall this finding confirms that borrowing is likely to be higher when creditors are better protected by law. The estimated coefficients for OWN are significant and positive for the whole sample period (0.316; t-ratio of 5.18) and after the crisis (0.532; t-ratio of 7.5), but significant and negative before the crisis (-0.245; t-ratio of -2.57). As discussed in section 3.2, both agency and signaling theories predict a negative relationship between ownership concentration and leverage because of the role of debt in mitigating both moral hazard and adverse selection problems. The pre-crisis result is consistent with the theory and the findings of previous studies (Wiwattanakantang, 1999; and Suto, 2003). However, the positive relationship found for the post-crisis period confirms that theories developed to explain behavior in major developed markets might not apply to emerging economies. In all the sample countries, with the exception of Australia, ownership is highly concentrated (see Table 1), with family holdings being a significant proportion. It is thus to be expected that there will be less asymmetries of information between owners and lenders, with lower transaction costs and easier access to borrowing. In uncertain times, like in the aftermath of a major crisis, the close relationship between borrowing firms and lenders is likely to become a more important determinant than market-based explanations. Thus, firms owned by a family or a small group of well-known investors may find borrowing easier.

## **5. Concluding Remarks**

The paper sets out to test for countries in the Asia Pacific region the findings of extant theoretical and empirical literature on the determinants of capital structure. Overall the results support existing evidence with respect to firm-specific determinants. However, they also show some significant differences between the sample countries, and thus the paper also seeks to test for country specific determinants. In addition, since the sample period straddles across the 1997 Asian Crisis, the paper investigates the impact of the crisis on the capital structure decision.

Firstly, the positive effect of firm size and the negative effect of growth opportunities, non-debt tax shield, liquidity and share price performance on leverage lend support to major capital structure theories. Secondly, the importance of the determinants of capital structure varies across countries in the region. For instance, profitability has significant influence on the capital structure of Malaysian firms and firm size has no effect on Singaporean firms. These differences confirm that managerial decisions may be affected by country specific considerations. This inference is supported by the findings following the introduction of country dummy variables and country specific variables, such as the level of stock market's activity, interest rates, creditor's rights and ownership concentration. Thirdly, the financial crisis of 1997 is found to have altered the role of both firm and country specific factors. For instance, the relationship between leverage and firm specific variables such as firm size, growth opportunities, non-debt tax shield, and liquidity, has altered between the pre- and post-crisis periods. In summary, the capital structure decision is not only the product of the firm's own characteristics but also the result of the corporate governance, legal framework and institutional environment of the countries in which the firm operates.

## References

- Antoniou, A., Y. Guney and K. Paudyal, 2002, Determinants of Corporate Capital Structure: Evidence from European Countries, Working Paper, University of Durham.
- Baker, M. and J. Wurgler, 2002, Market Timing and Capital Structure, *Journal of Finance* 62, 1 – 32.
- Bank Negara Malaysia, 1998, The East Asian Crisis – Causes, Policy Responses, Lessons and Issues, Working Paper 4, Central Bank of Malaysia.
- Beck, T., A. Demirguc-Kunt and V. Maksimovic, 2002, Financing Patterns around the World: The Role of Institutions, World Bank Policy Research Working Paper 2905.
- Booth, L., V. Aivazian, A. Demirguc-Kunt and V. Maksimovic, 2001, Capital Structure in Developing Countries, *Journal of Finance* 56, 87 – 130.
- Cassar, G. and S. Holmes, 2003, Capital Structure and Financing of SMEs: Australian Evidence, *Accounting and Finance* 43, 123 – 147.
- Cha, B. and S. Oh, 2000, The Relationship between Developed Equity Markets and the Pacific Basin's Emerging Equity Markets, *International Review of Economics and Finance* 9, 299 – 322.
- Claessens, S. and J. Fan, 2002, Corporate Governance in Asia: A Survey, *International Review of Finance* 3, 71-103.
- Claessens, S. and L. Klapper, 2002, Bankruptcy Around the World: Explanations of Its Relative Use, World Bank Policy Research Working Paper 2865.
- Claessens, S., S. Djankov and L. Klapper, 2002, Resolution of Corporate Distress in East Asia, *Journal of Empirical Finance* 10, 199 - 216.

- Claessens, S., S. Djankov and L. Lang, 1999, Who Controls East Asian Corporations?, World Bank Policy Research Working Paper 2054.
- Demirguc-Kunt, A. and V. Maksimovic, 1996, Stock Market Development and Firms' Financing Choices, World Bank Economic Review 10, 341 – 369.
- Demirguc-Kunt, A. and V. Maksimovic, 2002, Funding Growth in Bank-Based and Market-Based Financial Systems: Evidence from Firm-Level Data, Journal of Financial Economics 65, 337 – 363.
- Grenville, S., 1999, Financial Crises and Globalisation, Reserve Bank of Australia Bulletin August, 43 – 54.
- Harris, M. and A. Raviv, 1991, The Theory of Capital Structure, Journal of Finance 46, 297 – 355.
- La Porta, R., F. Lopez-de-Silanes and A. Shleifer, 1999, Corporate Ownership Around the World, Journal of Finance 54, 471 – 517.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny, 1998, Law and Finance, Journal of Political Economy 106, 1113 – 1155.
- Mak, Y. and Y. Li, 2001, Determinants of Corporate Ownership and Board Structure: Evidence from Singapore, Journal of Corporate Finance 7, 235 – 256.
- Meesok, K., I. Lee and O. Liu, 2001, Malaysia : From Crisis to Recovery, IMF Occasional Papers 207.
- Nesadurai, H., 2000, In Defence of National Economic Autonomy? Malaysia's Response to the Financial Crisis, Pacific Review 13, 73 – 113.
- Pandey, I., 2001, Capital Structure and the Firm Characteristics: Evidence from an Emerging Market, IIMA Working Paper 2001-10-04.

- Prasad, S., C. Green and V. Murinde, 2003, Company Financial Structures in Developing Economies: Evidence from a Comparative Analysis of Thai and Malay Companies, Working Paper, University of Birmingham.
- Rajan, R. and L. Zingales, 1995, What do We Know about Capital Structure? Some Evidence from International Data, *Journal of Finance* 50, 1421 – 1460.
- Scott, J., 1977, Bankruptcy, Secured Debt, and Optimal Capital Structure, *Journal of Finance* 32, 1 – 19.
- Suto, M., 2003, Capital Structure and Investment Behaviour of Malaysian Firms in the 1990s: A Study of Corporate Governance Before the Crisis, *Corporate Governance* 11, 25 – 39.
- Thies, C. and M. Klock, 1992, Determinants of Capital Structure, *Review of Financial Economics* 1, 40 – 52.
- Wiwattanakantang, Y., 1999, An Empirical Study on the Determinants of the Capital Structure of Thai Firms, *Pacific-Basin Finance Journal* 7, 371 – 403.
- Zoppa, A. and R. McMahon, 2002, Pecking Order Theory and the Financial Structure of Manufacturing SMEs from Australia's Business Longitudinal Survey, Research Paper Series 02-1, School of Commerce, The Flinders University of South Australia.



**Table 1: Major aspects of corporate governance and institutional environment in the Asia Pacific region countries, the UK and the US**

	Thailand	Malaysia	Singapore	Australia	UK	US	Source
<b>Financial Orientation</b>	Market Oriented	Market Oriented	Market Oriented	Market Oriented	Market Oriented	Market Oriented	Demirguc-Kunt and Maksimovic (2002)
<b>Legal Origin</b>	Common Law/ Civil Law (French)	Common Law	Common Law	Common Law	Common Law	Common Law	La Porta et al. (1998) / Claessens and Klapper (2002) Demirguc-Kunt and Maksimovic (2002)
<b>Rule of Law</b>							
Efficiency of Judicial System	3.25	9.00	10.00	10.00	10.00	10.00	La Porta et al. (1998)
Rule of Law	6.25	6.78	8.57	10.00	8.57	10.00	La Porta et al. (1998)
Law and Order	4.31	3.69	5.19	6.00	5.31	6.00	Demirguc-Kunt and Maksimovic (2002)
<b>Legal Protection</b>							
Shareholder Rights	2	4	4	4	5	5	La Porta et al. (1998)
Creditor Rights	3	4	4	1	4	1	La Porta et al. (1998)
<b>Control of Publicly Traded Companies (weighted by market capitalization, 1996)</b>							
Widely Held	8.2	16.2	7.6	-	-	-	Claessens et al. (1999)
Family	51.9	42.6	44.8	-	-	-	Claessens et al. (1999)
State	24.1	34.8	40.1	-	-	-	Claessens et al. (1999)
Widely Held Financial	6.3	1.1	2.7	-	-	-	Claessens et al. (1999)
Widely Held Corporation	9.5	5.3	4.8	-	-	-	Claessens et al. (1999)
<b>Control of Large Publicly Traded Firms (20% cutoff)</b>							
Widely Held	-	-	0.15	0.65	1.00	0.80	La Porta et al. (1999)
Family	-	-	0.30	0.05	0.00	0.20	La Porta et al. (1999)
State	-	-	0.45	0.05	0.00	0.00	La Porta et al. (1999)
Widely Held Financial	-	-	0.05	0.00	0.00	0.00	La Porta et al. (1999)
Widely Held Corporation	-	-	0.05	0.25	0.00	0.00	La Porta et al. (1999)
<b>Ownership by 3 Largest Shareholders of 10 Largest Non-Financial Domestic Firms</b>	0.47	0.54	0.49	0.28	0.19	0.20	La Porta et al. (1998)
<b>Bankruptcies</b>	0.12	-	3.06	2.10	1.85	3.65	Claessens and Klapper (2002)

**Table 2:**  
**Theories and expected relation between corporate factors and firm leverage**

Variables	Expected Theoretical Relation	Mostly Reported in the Empirical Literature	Theories
Tangibility	+	+	Agency theory: Agency cost of debt Trade-off theory: Financial distress/ Business risk
Profitability	-	-	Pecking order theory Trade-off theory: Bankruptcy costs Other theory: Dilution of ownership structure
	+		Trade-off theory: Tax Free cash flow theory Signalling theory
Firm Size	+	+	Trade-off theory: Bankruptcy costs / Tax Agency theory: Agency cost of debt Other theories: access to the market, economies of scale
	-		Other theory: Information asymmetry
Growth Opportunity	-	-	Agency theory: Agency cost of debt Trade-off theory: Financial distress
	+		Signalling theory Pecking order theory
Non-Debt Tax Shield	-	-	Trade-off theory: Tax
Liquidity	-	-	Agency theory: Agency cost of debt Free cash flow theory Pecking order theory: use of internal resources
	+		Other theory: Ability to meet short-term obligation
Earnings Volatility / Risk	-	-	Trade-off theory: Financial distress
	+		Agency theory
Share Price Performance	-	-	Market timing theory

**Table 3**  
**Summary Descriptive Statistics**

LEV (leverage) is the debt to capital ratio. TANG (tangibility) is the ratio of total fixed assets to total assets. PROF (profitability) is the ratio of earnings before interest, tax and depreciation to total assets. SIZE is the natural logarithm of total assets. GROW (growth opportunity) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. NDTS (non-debt tax shield) is a ratio of depreciation to total assets. LIQ (liquidity) is a ratio of current assets to current liabilities. VOL (earnings volatility) is the absolute difference between annual % change in earnings before interest and taxes and the average of this change. SPP (share price performance) is measured as first difference of logs of annual share prices.

Thailand	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP
Mean	0.4436	0.4326	0.1056	14.5149	1.3624	0.0439	1.5333	3.2767	-0.1996
Std. Dev	0.3098	0.2259	0.1495	1.7077	1.0681	0.0284	1.9075	13.2834	0.7097
Minimum	0.0000	0.0007	-1.7030	5.4708	0.1318	0.0000	0.0000	0.0000	-4.6052
Maximum	0.9979	0.9711	1.4748	19.6612	18.8767	0.2159	23.5056	232.0859	2.3434

Malaysia	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP
Mean	0.2697	0.3799	0.0667	12.5064	2.0103	0.0282	1.8178	2.6391	-0.0989
Std. Dev	0.2608	0.2246	0.2166	1.4069	2.5881	0.0214	2.5147	7.9972	0.7641
Minimum	0.0000	0.0000	-4.3533	8.2900	0.0416	0.0000	0.0139	0.0000	-3.1970
Maximum	0.9734	0.9750	0.7131	17.7569	53.6799	0.2164	66.3592	106.0963	2.5924

Singapore	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP
Mean	0.2401	0.3510	0.0834	12.0228	1.5236	0.0328	1.8520	2.3613	-0.1085
Std. Dev	0.2145	0.2106	0.0907	1.3744	1.0358	0.0261	1.3352	7.7428	0.6006
Minimum	0.0000	0.0004	-0.7330	8.6691	0.2879	0.0000	0.0434	0.0000	-2.4746
Maximum	0.9187	0.9551	0.3755	17.4628	11.7017	0.2167	15.0551	130.3261	2.2970

Australia	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP
Mean	0.1856	0.3342	0.0758	12.3413	-8.8308	0.0387	2.9478	4.0945	0.0408
Std. Dev	0.1871	0.2233	0.4514	2.1057	40.0494	0.0438	6.4947	19.5256	0.5948
Minimum	0.0000	0.0000	-7.7156	5.2149	-579.19	0.0000	0.0249	0.0000	-3.1086
Maximum	0.9638	0.9574	2.5870	17.9989	18.7706	0.9517	75.5859	370.1190	4.0209

**Table 4 : Cross-sectional analysis of the firm specific determinants of leverage in the Asia Pacific region**

$$\text{Leverage}_{i,t} = \beta_1 + \beta_2 \text{TANG}_{i,t-a} + \beta_3 \text{PROF}_{i,t-a} + \beta_4 \text{SIZE}_{i,t-a} + \beta_5 \text{GROW}_{i,t-a} + \beta_6 \text{NDTS}_{i,t-a} + \beta_7 \text{LIQ}_{i,t-a} + \beta_8 \text{VOL}_{i,t-a} + \beta_9 \text{SPP}_{i,t-a} + \varepsilon_{i,t}$$

Variables	Thailand			Malaysia			Singapore			Australia		
	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis
<b>Constant</b>	0.0817	0.4100***	0.2374	0.1980	0.2218	0.3390***	0.2905	0.4677**	0.2482	-0.1306	0.1240	-0.1700*
t-statistics	(0.3849)	(2.8522)	(1.1490)	(1.3962)	(1.4661)	(2.8672)	(1.3169)	(2.4498)	(1.1806)	(-1.3109)	(0.6704)	(-1.8024)
Wald Test			<2.0396>			<8.9291>***			<1.9829>			<2.8808>*
<b>TANG</b>	0.1647	0.0096	0.0830	0.0404	-0.0626	0.0956	0.1027	0.1307	0.0035	0.1955**	-0.0236	0.1979**
t-statistics	(1.4382)	(0.1208)	(0.6469)	(0.5947)	(-0.9886)	(1.4403)	(0.8742)	(1.0512)	(0.0336)	(2.3544)	(-0.1646)	(2.5558)
Wald Test			<0.9036>			<0.3685>			<0.0013>			<7.6095>***
<b>PROF</b>	-0.2561	-0.5058***	-0.5563***	-0.8142***	-0.6977***	-0.4521***	-0.1834	-0.1173	-0.2695	-0.0568	0.0201	-0.0772
t-statistics	(-0.9196)	(-2.7392)	(-3.0813)	(-4.8539)	(-5.0258)	(-4.9134)	(-0.5939)	(-0.3013)	(-1.0077)	(-0.7838)	(0.3069)	(-0.8626)
Wald Test			<0.1346>			<18.5424>***			<1.8382>			<0.8423>
<b>SIZE</b>	0.0315***	0.0120	0.0328***	0.0329***	0.0130	0.0192**	0.0251	-0.0066	0.0246*	0.0299***	0.0078	0.0316***
t-statistics	(2.6213)	(1.4604)	(2.6475)	(3.5395)	(1.2467)	(2.4664)	(1.6182)	(-0.5300)	(1.7090)	(3.8037)	(0.4773)	(4.2547)
Wald Test			<9.9026>***			<6.4001>**			<4.2885>**			<15.6852>***
<b>GROW</b>	-0.0623**	-0.0540***	-0.0872	-0.0029	-0.0057	-0.0440***	-0.0713***	-0.0561**	-0.0723***	0.0001	0.0007	-0.0002
t-statistics	(-2.1136)	(-3.0772)	(-1.6290)	(-0.2730)	(-1.1875)	(-2.7380)	(-2.7062)	(-2.4923)	(-3.0949)	(0.1408)	(0.9266)	(-0.4141)
Wald Test			<5.9451>**			<22.1087>***			<0.7754>			<0.1480>
<b>NDTS</b>	-2.5573***	-0.8552	-1.6209**	-2.4605***	-0.7225	-2.5251***	-2.7709***	-1.9254	-1.5163**	-1.2201**	-0.3952	-1.1701***
t-statistics	(-3.1771)	(-1.2718)	(-2.3845)	(-3.2152)	(-1.0257)	(-3.6835)	(-3.4073)	(-1.4516)	(-2.3077)	(-2.2811)	(-0.8426)	(-4.0655)
Wald Test			<5.7658>**			<20.9707>***			<4.8766>**			<11.1914>***
<b>LIQ</b>	-0.0591**	-0.0301*	-0.0786***	-0.0433**	-0.0049	-0.0565***	-0.0682***	-0.0327*	-0.0635***	-0.0040**	-0.0023	-0.0042**
t-statistics	(-2.3208)	(-1.7730)	(-2.6220)	(-2.5398)	(-0.4409)	(-3.8952)	(-3.2718)	(-1.7728)	(-2.9362)	(-2.2669)	(-0.3902)	(-2.2897)
Wald Test			<21.5140>***			<85.8641>***			<4.4432>**			<3.2021>**
<b>VOL</b>	0.0023	0.0003	0.0024*	-0.0003	0.0005	-0.0008	-0.0027	0.0008	-0.0019	0.0012	-0.0010	0.0013
t-statistics	(1.1816)	(0.6285)	(1.7121)	(-0.1887)	(0.2063)	(-0.4453)	(-0.5280)	(0.3750)	(-0.4253)	(1.3118)	(-0.8342)	(0.7458)
Wald Test			<3.6780>*			<0.3360>			<0.6786>			<1.7299>
<b>SPP</b>	-0.6497***	-0.3096***	-0.1899***	-0.3099***	-0.1945***	-0.2587***	-0.3513***	-0.1253*	-0.3017***	-0.2452**	0.0221	-0.2464***
t-statistics	(-5.6853)	(-5.4233)	(-3.3197)	(-6.6146)	(-2.6996)	(-7.0460)	(-2.8776)	(-1.7625)	(-3.6024)	(-2.4488)	(0.2067)	(-4.6967)
Wald Test			<5.3208>**			<3.6252>*			<6.8993>***			<35.4607>***
<b>Adj R<sup>2</sup></b>	0.4665	0.4409	0.4149	0.3614	0.2321	0.4393	0.3232	0.2346	0.3424	0.2028	-0.1172	0.3042
<b>No. of obs.</b>	277	197	277	584	235	584	211	105	211	187	79	187

\*, \*\*, \*\*\* Significant at 10%, 5% and 1% level, respectively

The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors

Industry dummies were included in the model in order to control for industry effects but no statistically significant effect was found

See Table 3 and Section 3.1 for the definition of the variables

**Table 5 : Fixed country effects analysis of the determinants of leverage in the Asia Pacific region**

$$\text{Leverage}_{i,t} = \beta_1 + \beta_2 \text{TANG}_{i,t} + \beta_3 \text{PROF}_{i,t} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{GROW}_{i,t} + \beta_6 \text{NDTS}_{i,t} + \beta_7 \text{LIQ}_{i,t} + \beta_8 \text{VOL}_{i,t} + \beta_9 \text{SPP}_{i,t} + \beta_{10} \text{FACT}_t + \beta_{11} \text{INT}_t + \beta_{12} \text{THDUM} + \beta_{13} \text{MLDUM} + \beta_{14} \text{SPDUM} + \epsilon_{i,t}$$

Equation	Full Sample	Pre-Crisis	Post-Crisis
<b>Constant</b>	0.0735	0.1818 ***	0.0838
t-statistics	(1.0300)	(2.9200)	(0.6300)
Wald Test			<0.5428>
<b>TANG</b>	0.0630 **	0.0337	0.0780 **
t-statistics	(2.1200)	(1.2600)	(2.5700)
Wald Test			<6.6228> **
<b>PROF</b>	-0.2242 **	-0.0541	-0.2826 ***
t-statistics	(-2.4600)	(-1.1200)	(-6.2000)
Wald Test			<38.4080> ***
<b>SIZE</b>	0.0309 ***	0.0215 ***	0.0350 ***
t-statistics	(8.8700)	(8.9900)	(7.1500)
Wald Test			<7.6056> ***
<b>GROW</b>	-0.0009	-0.0002	-0.0006
t-statistics	(-1.5500)	(-0.3540)	(-0.8040)
Wald Test			<0.6471>
<b>NDTS</b>	-0.5665 ***	-0.2147 ***	-0.7610 ***
t-statistics	(-2.8200)	(-3.4300)	(-2.9400)
Wald Test			<4.4646> **
<b>LIQ</b>	-0.0155 *	-0.0054	-0.0205 *
t-statistics	(-1.8800)	(-1.5000)	(-1.7000)
Wald Test			<2.8771> *
<b>VOL</b>	0.0012 ***	0.0006 ***	0.0016 ***
t-statistics	(5.5000)	(6.0000)	(3.2800)
Wald Test			<4.0658> **
<b>SPP</b>	0.0036	0.0191	0.0008
t-statistics	(0.3630)	(1.4600)	(0.0391)
Wald Test			<0.0015>
<b>FACT</b>	-0.9404 ***	-2.7638 ***	-0.5362 ***
t-statistics	(-2.6800)	(-3.1800)	(-3.1000)
Wald Test			<166.1190> ***
<b>INT</b>	0.0031	-0.0041	0.0099 *
t-statistics	(0.7750)	(-0.6560)	(1.7600)
Wald Test			<3.0978> **
<b>THDUM</b>	-0.1809 ***	-0.2170 ***	-0.1586 ***
t-statistics	(-8.7300)	(-8.0800)	(-8.2000)
Wald Test			<9.1359> ***
<b>MLDUM</b>	-0.1574 ***	-0.1810 ***	-0.1524 ***
t-statistics	(-6.4200)	(-4.7300)	(-7.3700)
Wald Test			<1.9150>
<b>SPDUM</b>	-0.2003 ***	-0.0861 ***	-0.2313 ***
t-statistics	(-33.5000)	(-6.3600)	(-67.9000)
Wald Test			<1,815.2000> ***
<b>Adj R<sup>2</sup></b>	0.3661	0.2744	0.3446
<b>No. of obs.</b>	7541	1868	4780

\*, \*\*, \*\*\* Significant at 10%, 5% and 1% level, respectively

The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors

Industry dummies were included in the model in order to control for industry effects but no statistically significant effect was found

See Table 3 and Sections 3.1 and 3.2 for the definition of the variables

